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SYNCHRO ' SETTE



THE SUBSCRIPTION MAGAZINE FOR
THE T/S-1000 and THE ZX-81 MICROCOMPUTERS

SYNCHRO SETTE

The Subscription Magazine For The
ZX-81 AND T/S-1000 MICROCOMPUTERS

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OCTOBER 1982

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SORTS - CONT.

And there you have it. RUN the program now the same way as before and observe the results. Everything is sorted as you can see. Beautiful, right?

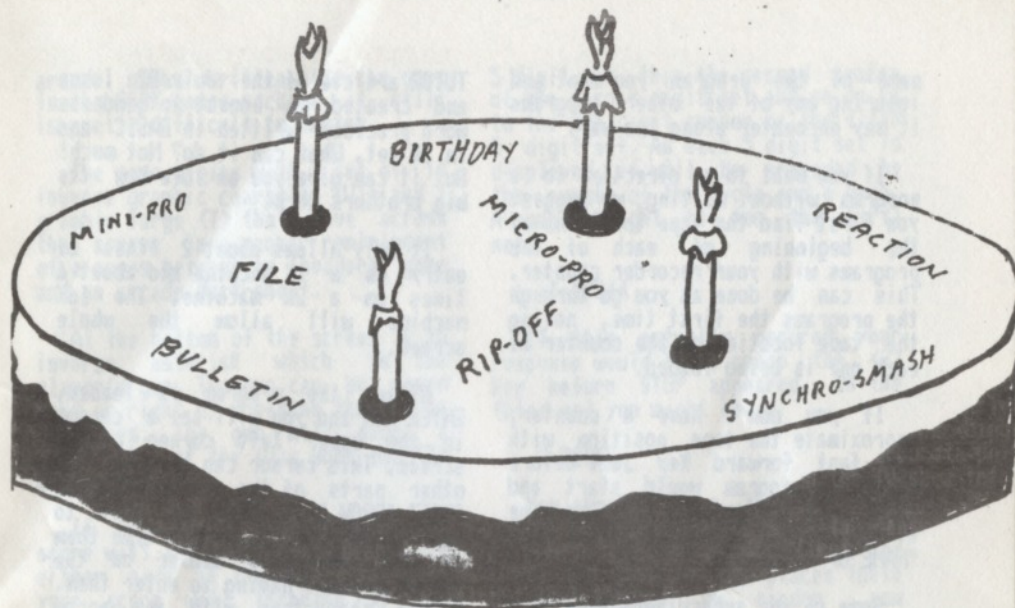
Replace the SKELETON PROGRAM with a DRIVER PROGRAM of your own design to sort the inputs you make yourself.

It should be a simple affair to find the areas of the Bubble Sort program and the Exchange Sort program and insert the same routine

to sort the inputs you create there.

For your homework, I would like you all to use these techniques that you now have mastered and use them to create a sort routine that can be inserted into the FILE program and will sort all the arrays in proper order.

Stop your screaming. Class dismissed.



THIS MONTH'S CASSETTE PROGRAMS

There are 8 programs on this month's cassette. We have established the format suggested by Mr. Koska in his letter to the editor and outlined in last month's issue. To briefly review the new method of the way the programs are recorded on the cassette, it will be from now on as follows:

Each program is recorded only once on each side of the cassette. The first programs that can be LOADED will be of the small size followed by the larger sized programs. For example, this month's cassette has as the first and second programs recorded, 1K programs. The 3rd and 4th programs are 2K and the last 4 programs are 16K. The other side of the cassette is a duplicate of the first side.

For you new subscribers who aren't familiar with LOADING procedures for cassette programs, follow the following directions:

A - Make sure that the volume setting of the recorder is set at

about 80 % maximum.

B - If you have a Bass and/or Treble control on the recorder, make sure the Treble is at maximum and the Bass is at minimum.

C - To LOAD the first program, type in LOAD "" and press the ENTER key on the computer. Then press the PLAY button of the recorder. The lead time on the OCT/82 cassette is 21 seconds until the first program begins.

The time needed to load the loader program is 15 seconds. When the program is loaded, the screen will first go blank and then a list of this month's programs will appear.

Shut off the recorder when the loader program is loaded. Any of the listed programs can now be loaded into the computer by pressing the appropriate number on the keyboard and pressing the PLAY key on the recorder. The loader program loads the program by searching for the

name of the program you want and ignoring any of the other programs it may encounter along the way.

If you want to go directly to a program without waiting, we suggest you first find the tape location of the beginning of each of the programs with your recorder counter. This can be done as you go through the programs the first time, noting the tape location on the counter as each one is being loaded.

If you don't have a counter, approximate the tape position with the fast forward key just before where the program would start and then LOAD the program with the name of the program using the format LOAD "NAME OF PROGRAM".

Some of our subscribers have told us that they could not get the programs to load by name but they would load with the double quotes. Others have told us that the loader program wouldn't load certain programs. Most have told us that all the programs could be loaded either way. Every customer's cassette is made from the same master tape so the programs on everyone's cassettes are identical. We feel it is most probably a problem of volume adjustment.

PROGRAMS (SR = self running
- program name has inverse
last character /RT = run
time/LT = load time)

1 - "BIRTHDAY" 1K/LT= :09

Have you ever wondered how many people it would take to have the probability of at least 2 of them having the same birthday? Probably not, but this program will show you anyway. Computers are excellent devices for demonstrating probability statistics. BREAK the program and LIST if the heading scrolls by too fast.

2 - "MICRO-PRO" 1K/LT= :19

The Old Professor got tired of waiting for someone to take the lesson he taught in the COMPUTER

TUTOR article of the July/82 issue and created an honest to goodness word processor written in BASIC and in 1K yet. What can it do? Not much! But it can give you an idea how its big brothers work.

It only allows about 2 lines of entry on a 1K machine and about 6 lines on a 2K machine. The 16K machine will allow the whole screen.

After the program is loaded, ENTER RUN and you will see a cursor in the upper left corner of the screen. This cursor can be moved to other parts of the screen with the SHIFT ARROW keys. When you want to type in characters, simply type them in and they will appear on the screen without having to enter them. Delete characters with any arrow simply by running over the character with the cursor.

If you never have operated a word processor before, this program can give you the feeling of controlling the whole screen the way real word processing programs do. If you have entered text and pressed the BREAK key by accident - not to worry. Just enter the command CONT and the text and cursor should reappear on the screen.

3 - "RIP-OFF" -2K/SR/LT= :18
RT= :20

Rather than telling you what this program is supposed to do, we'll let it be a surprise. The title should give you some indication and I hope you are not too mad at us.

It does have its redeeming qualities however. Lines 90 to 130 create a scrolling technique that is more difficult to program than creating the same effect but in the opposite direction.

4 - "SYNCR0-SMASH" -2K/SR
LT = :28

This program is an excellent example of what can be done in 2K that can't be done in 1K. Although not as elaborate as some of the 2K

arcade games written like the ones in the 3-2K games package, it still is pretty difficult to master.

The game begins with a set of 14 inverse graphic character (V)s and 1 graphic large (T) that move across the screen in a manner reminiscent of a cross between an Invaders game and an arcade duck-shoot.

At the bottom of the screen is an inverse asterisk which is the player's gun. The gun can be moved left or right by pressing the (1) or (0) keys. The gun will shoot a projectile at the (V)s when the (2) key is pressed.

If one of the (V)s is hit, your score will increase by 10 points. If either side if the big (T) is hit, your score will increase by 100 points. If you miss, your score will be decreased by -50 points. After the first shot is recorded, a running score will be recorded at the bottom of the screen. If your score becomes less than -150, the game will end. If you get all the graphic characters, the game will end. A perfect score is 340.

It is possible to remove all the graphic characters and still have a score lower than 0.

5 - "REACTION" -16K/SF/LT = 1:55

Originally, I wanted to call this program "THE DRUNK-O-METER". It is an excellent method of testing eye to hand coordination and reflex time.

It comes with all the instructions at the beginning of the program but I will go over them again here.

The program will display 5 sets of 5 digit numbers. The numbers are 8 times the normal size and each set will appear only briefly on the screen. AFTER the large number disappears from the screen, you have to enter a number into the keyboard before the word (STOP) flutters on the screen. The number you enter has to be the first number of the first

5 digit set, then the second number of the second digit set and so on up to the 5th digit number of the fifth 5 digit set. As each 5 digit set is displayed, it will be preceded by the number of the cycle and a dash. A sample might be for the first set:

1-29764

If this actually occurred, your response would be to press the (2) key before STOP appeared. On the third set you might see:

3-82855

You should press the (8) key. Easy, huh? To make it a little more difficult, we have entered a routine into the program that places these large numbers in random row positions of the screen so that you cannot expect to train your eyes at any one screen position expecting the number you are looking for to appear. You will have plenty of time to wait between cycles as it takes 15 seconds for each number to be generated.

Now for the RULES. There are 9 difficulty levels but you do not get to choose the one you want. You automatically start with level 5. If all of your 5 responses are correct, the program will cycle up to the next difficulty level. The effect of this is that the large number will be displayed for a shorter period of time and the amount of response time you have will be shorter therefore making it more difficult to get all 5 correct.

If however you input your response to late or input the incorrect response for any of the large numbers, you will drop a level and the display time and time allowed for your response will become longer making it easier to get all 5 correct.

If you are at level 1 and get an incorrect response the game will be over. If you are at level 9 and get all 5 correct, the game will also be over.

Neither situation should occur because level 1 is rather easy and level 9 is virtually impossible. You should settle in at some level in between and here is where you can tell how you compare with your cohorts. You may find this program a challenge for many hours.

6 - "MINI-PRO" - 16K/SR/LT - :50

If you thought MICRO-PRO was too simple, here is another word processor by the Old Professor that is faster and has more features. It has a blinking cursor that can be moved with the SHIFT ARROW commands. Data can be displayed by setting the cursor in position and typing in the characters. Characters can be deleted by back-spacing or going over. No insertion routine exists so be careful to input the correct entries.

When you reach the end of a paragraph, just press ENTER and a CARRIAGE RETURN will occur. To CLEAR the screen, press SHIFT ENTER. To return the CURSOR to the BEGINNING of the screen, press SHIFT (H) for home. To bring the cursor to the END position of the screen, press SHIFT (N).

CAUTION - do not press the BREAK key - all data will be lost.

To SAVE the text on tape, press SHIFT (S). The (L) cursor will appear at the bottom of the screen. Type in the name you want to call your text. Set up your recorder with a blank data tape in the RECORD mode and press ENTER on the computer. After the text is saved, it can be recalled at a later time by name or double quotes and the text will appear on the screen.

Feel free to use this program to create messages on tape that you can send to your fellow computer owners.

7 - "FILE" - 16K/SR/LT= 2:04

Here is the sequel to the "NAME/ADD" program on the AUG/82 cassette that so many of you had

problems with. This one has more conventional programming routines and it works.

When you first LOAD it, DO NOT TRY TO ENTER DATA UNTIL IT HAS BEEN INITIALIZED. This can be accomplished by selecting option (3) which will dimensionalize the variables to be used.

The reason we do this is that the program has been designed to allow input of 100 customers with 8 entries per customer. It loads off of our cassette in 2 minutes and 4 seconds. If we sent it to you already dimensionalized, it would take over 5 minutes to load.

If you want to use it for a maximum of 100 customers, it will take over 5 minutes to save the data on tape. It will also pause for 37 seconds after the last customer is entered before it returns to the menu.

If you have less than 100 customers or names and addresses that you want to enter, BREAK the program and change the number (100) in line #5 to whatever amount you feel is suitable. To use the program in the example that will soon follow, change it to (5).

The parameters for the inputs are as follows:

LAST NAME	- 16 CHAR. MAX.
FIRST NAME	- 12 CHAR. MAX.
ADDRESS	- 16 CHAR. MAX.
CITY OR TOWN	- 16 CHAR. MAX.
STATE	- 2 CHAR. MAX.
ZIP CODE	- 5 CHAR. MAX.
PHONE #	- 12 CHAR. MAX.
REMARKS	- 12 CHAR. MAX.

If you exceed the maximum amount of characters specified, the computer will automatically truncate (chop off) the string to the specified amount. Let us try a few sample inputs. After you have set T to equal 5 in line #5, RUN the program and exercise option #1.

Input the following data for the prompts:

NO.1 LAST NAME? SMITH
FIRST NAME? JOHN
ADDRESS? 123 45TH ST
CITY/TOWN? ANYTOWN
STATE? IL
ZIP CODE? 66666
TELEPHONE NO.? 123-4567
REMARKS? SALESMAN

NO.2 LAST NAME? STOKES
FIRST NAME? SAM
ADDRESS? 9876 5TH AVE
CITY/TOWN? PODUNK
STATE? NY
ZIP CODE? 11111
TELEPHONE NO.? 222-333-4444
REMARKS? MECHANIC

NO.3 LAST NAME?

At this point, just press the ENTER key. The program will now return to the menu. You will notice it takes about 3 seconds for just 5 maximum customers before the menu is displayed. Now let's exercise option #2 and press the (2) Key.

DO YOU WANT TO SEE THE WHOLE FILE? Press the (Y) key.

The first customer is displayed. Press ENTER and the second customer is displayed. Press it again and the menu is returned.

Exercise option #2 again and this time press the (N) key to the question of seeing the whole file.

WHAT IS THE LAST NAME?

At this point we don't have to enter the entire last name - only the first few characters that we feel would be unique to that person's name. We have two names beginning with the letter (S). Enter the letter (S).

Mr. Smith's data is displayed.

IS THIS THE CORRECT NAME? Press the (N) Key.

Mr. Stokes data is displayed.

IS THIS THE CORRECT NAME? Press the (N) Key.

NAME NOT IN FILE?

Press the ENTER key and the menu is returned. Press the (2) key again, then press the (N) key and this time ENTER the characters "ST".

You will notice that Mr. Smith was skipped over and Mr. Stokes data is now displayed. Answer the prompt by pressing the (Y) Key.

DO YOU WANT TO EDIT? If we answer no, the menu will return. Press the (Y) key.

Let us say that Mr. Stokes was promoted to foreman. Press the (8) key and ENTER "FOREMAN".

You will notice that you are still in the EDIT mode. You can edit as many categories as you like and when you want to exit the EDIT mode, press the (N) key.

Exercise option #1 if you like and add up to 3 more customers or acquaintances if you like. When you want to SAVE the file, exercise option #4. You will be asked for a name. ENTER the name you want to call the file and then set up your data cassette with the recorder in the RECORD mode. Then press ENTER on the computer.

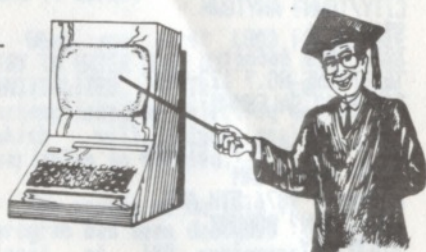
If at this point you want to start a new file, press the (3) key and all the data will be cleared out and the program can start fresh.

Make sure line #5 has the correct maximum number of entries you want to make.

8 - "BULLETIN" -16K/SR/LT = 2:08/RT
= 10:41

Our monthly bulletin board program. After you have RUN it, BREAK the program and find the machine code routines at the beginning of the listing that black out the screen and allow printed display on the bottom 2 screen rows that are normally reserved for keyboard data entry.

OUT OF SORTS



Good morning class. My, there seems to be a lot more students today. I've received many letters and phone calls about the things you have learned and I must say, I'm proud of you all.

Today's lesson will be about sort routines. Can anyone give me an example what useful purpose a sort routine can serve? Yes, the gentleman in the back has his hand up?

Ah, for once he is stumped. What is a sort routine, he asks? Well, I'll tell you.

Let us suppose that we have a small business and we want to keep a record of our customers' names and addresses and other pertinent information. This information could be processed with a program like the FILE program on this month's cassette.

Let us say that in our type of business, it was essential to periodically send out mailings to our customers describing various sale items or new products. To send out these mailings, we find it is much cheaper to send them by bulk mail. The United States Postal Service requires that these mailings be separated by certain standards, all of which involve the mailings to be sorted.

We know that computers can be instructed to print mailing labels so it should be a simple matter to write a sort routine to accommodate us, right? Right!

To demonstrate a sort routine, we first need what is called a SKELETON program to generate the items we want to be sorted.

We could write a program such as the following:

DRIVER PROGRAM

```
10 DIM A$(20,10)
20 FOR N = 1 TO 20
30 INPUT A$(N)
40 NEXT N
```

This program would allow us to INPUT 20 names of a maximum length of 10 characters each. This program however would not be too practical for our purposes because we would be spending too much time entering the names each time we want to use it. The following program is much more practical for our applications:

SKELETON PROGRAM

```
10 INPUT B
20 FAST
30 DIM A$(B,5)
40 FOR N = 1 TO B
50 LET B$ = ""
60 FOR A = 1 TO 5
70 LET B$ = B$ + CHR$(INT
  (26*RNDR) + 38)
80 NEXT A
90 LET A$(N) = B$
100 NEXT N
110 FOR N = 1 TO B
120 PRINT N, A$(N)
130 NEXT N
140 SLOW
150 INPUT B$
160 FAST
```

RUN this program and you will see

the prompt at the bottom of the screen in the form of the <L> cursor. You are now being asked by the computer, how many items you want to be generated. ENTER the number "20" (you can enter up to "22" but no more as the program will break with a "screen full" error - we will use "20" whenever screen data is to be displayed).

This number will be the numeric variable in line #10. Line # 30 tells the computer to allow 20 strings to be created with a length of 5 characters each. The routine from line #40 to line #100 creates these character strings with line #70 creating the individual random alphabetic characters from A to Z and the routine from line #110 to #130 displays these strings on the screen. Lines #20 & #140 increase the speed of the character generator routine.

The gentleman in the rear has his hand up again. Yes sir? What is the prompt at the bottom of the screen for he asks.

After this SKELETON program has RUN, this prompt will appear at the bottom of the screen. This is because of line #150 and is followed by line #160 that puts the computer into the FAST mode again.

This is to allow the various sort routines to be added to this SKELETON program and lets the user observe the unsorted data before it is sorted. The user simply will press the ENTER key which will begin the sort, once the routine is added to the SKELETON program.

At this point, save this program on cassette with the name "SKELETON". We will call this program back to be used for 4 different sort programs, so there is no need to re-type it in each time.

To the SKELETON program, add the following lines:

#1 - BUBBLE SORT

1000 CLS

```
1010 LET I = B - 1
1020 FOR J = 1 TO I
1030 LET K = J + 1
1040 FOR L = B TO K STEP -1
1050 IF A$(L) > A$(J) THEN
    GOTO 1090
1060 LET B$ = A$(L)
1070 LET A$(L) = A$(J)
1080 LET A$(J) = B$
1090 NEXT L
1100 NEXT J
1200 FOR N = 1 TO B
1210 PRINT N, A$(N)
1220 NEXT N
1230 SLOW
```

The lines from #1200 to #1230 will display the sorted data and will be used in all of the sort program routines to follow. The lines in between the SKELETON program and line #1200 will be the sort routines.

If we now RUN the program, we will first enter the number "20". About 7 seconds later, the 20 five character strings will be displayed. After they are displayed, press the ENTER key again and after about 7 seconds the sorted data will be displayed. RUN the program a few times. If you have a stopwatch, time the duration for the second segment from the time you press the ENTER key till the time the data is displayed. You will notice that the time is approximately the same each time providing you are sorting the same amount of data each time.

This amount of time, however, includes the amount of time needed to display the data on the screen as reflected by the commands in lines #1200 thru #1230. To get a true picture of the exact sort time, insert the following line:

1199 STOP

This will STOP the program immediately after the sort is completed with the code 9/1199 displayed at the lower left corner of the screen. You will notice that with 20 strings, the time is cut almost 40%.

Insert the following line:

105 GOTO 140

This allows the program to bypass the screen display of the generated data so that we can concentrate entirely on the amount of time it takes for the generation of the data and the time for sorting.

Now RUN the program and ENTER the following values "25", "50" and "100" for each of 3 separate RUNs and time the first segment (Generation Time) and the second segment (Sort Time). (note - at least 2K needed) Your time data should be close to the following:

Strings / Gen. Time /Sort Time

25	:04.3	:06.7
50	:08.4	:25.7
100	:17	1:43

You will notice with the Bubble sort, it takes approximately 4 times as long to sort twice as many items. The sort time involved seems to be directly proportional to the square of the items sorted.

If you have a 16K RAMpack and the time, you may want to try sorting 200, 500 or 1000 strings and seeing if this same ratio holds true. You may be surprised at the results.

#2 - EXCHANGE SORT

Let us try another routine called the Exchange Sort. Save this program on tape under the name "BUBBLE SORT", ENTER NEW into the computer and reload the SKELETON program.

Now add the following lines:

```
1000 CLS
1020 FOR P = 0-1 TO 1 STEP -1
1030 FOR Q = 1 TO P
1040 IF A$(Q) <= A$(Q+1) THEN
    GOTO 1080
1050 LET B$ = A$(Q)
1060 LET A$(Q) = A$(Q+1)
1070 LET A$(Q+1) = B$
1080 NEXT Q
1090 NEXT P
1200 FOR N = 1 TO B
```

1210 PRINT N, A\$(N)

1220 NEXT N

1230 SLOW

If we now RUN the program and enter 20 for the amount of strings we want generated, we see that when the second segment of the program is activated, we have a sort and display time of about 8 seconds. Enter the following lines:

105 GOTO 140

1199 STOP

We again have the situation where we can time the sorting part of the program. RUN the program again 3 times entering the values of "25", "50" & "100" for the amount of strings to be created and sorted.

We don't have to be concerned with the string generation time because each was already established by the Bubble Sort program. The same routine is used for both the Bubble Sort and the Exchange programs to create the random strings so the times will be the same. This will also be true for any of the additional sort routines that will be added to the SKELETON program.

To compare the two sort programs we have the following data:

Strings	25	50	100
BUBBLE	:06.7	:25.7	1:43.0
EXCHANGE	:08.5	:35.8	2:07.5

Now we notice something funny. For the Exchange Sort, the ratio between the time it takes to sort 50 items as opposed to 25 items is about 4.2 to 1. The time it takes to sort 100 as opposed to 50 is about 3.5 to 1.

This is interesting in that we have an indication that one sort routine may take longer than another with lesser amounts but may be faster when there are larger amounts to be sorted.

If you want to sort 200 strings (believe it or not, this will work on a 2K machine), you will find it takes 8:42.7 which is a 4.1 to 1

ratio to 100 strings sorted.

Let us move on to still another sort.

#3 - SHELL SORT

Save this program on cassette under the name "EXCHANGE SORT", ENTER NEW and reload the SKELETON program. Now enter the following lines:

```
1000 CLS
1010 LET N = B
1020 LET N = INT N/2
1030 IF N = 0 THEN GOTO 1199
1040 LET J = 1
1050 LET K = B - N
1060 LET I = J
1070 LET L = I + N
1080 IF A$(I) <= A$(L) THEN
    GOTO 1150
1090 LET B$ = A$(I)
1100 LET A$(I) = A$(L)
1110 LET A$(L) = B$
1120 LET I = I + N
1130 IF I < 1 THEN GOTO 1150
1140 GOTO 1070
1150 LET J = J + 1
1160 IF J > K THEN GOTO 1020
1170 GOTO 1060
1200 FOR N = 1 TO B
1210 PRINT N, A$(N)
1220 NEXT N
1230 SLOW
```

Again, let's RUN the program and ENTER "20" for the amount of strings. When we activate the second segment, we get a sort and display time of about 7 seconds.

Again we insert the following lines:

```
105 GOTO 140
1199 STOP
```

RUN the program 3 times with the values of "25", "50" and "100" for the amount of strings to be generated and sorted.

Our time data should now be as follows:

Strings	25	50	100
BUBBLE	:06.7	:25.7	1:43.0
EXCHANGE	:08.5	:35.8	2:07.5
SHELL	:04.5	:13.7	:30.7

As we all can now see, there is a considerable difference in time using the Shell sort. As a matter of fact, sorting 200 strings takes only 1:21.5 (will work on a 2K machine), a considerable difference compared to the 8:42.7 needed to sort 200 items using the Exchange sort.

This particular version is called the SHELL METZNER sort and is considered by most to be the fastest of all the sort routines that are written in BASIC. If you RUN the programs a few times using the same input for the amount of strings to be sorted, you may notice that the sort times may differ from the ones I have listed here. The sort times differ depending on how close the original data is already close to being sorted.

The man in the back row has another question. What is it Sir?

He wants to know how we can use these programs to sort numeric data. Good question.

We can have the program generate numeric data that you can sort instead of string data by doing the following. First change all the numeric variable (B) letters to (C) (not the (B)s that are followed by a (\$)). Then remove all of the dollar signs from the program and change lines #70 & #90 to read:

```
70 LET B$ = B$ + CHR$(INT
    (10*RND)+28)
90 LET A(N) = VAL B$
```

Does that answer your question Sir? Thank you.

The Bubble Sort and Exchange Sort depend heavily on exchanging the total string variables from one position in the list to another where the Shell sort depends primarily on swapping the variable number pointers (the N in A\$(N)). By using the integer function in line

#1020, the process is speeded up considerably.

Some BASICs on other computers have the `VARPTR` function which allows the sort to be even faster.

This is by no means the fastest possible method. Let us consider a situation where a routine may be needed to sort large numbers of customer data.

I wrote a customer file program for another brand of microcomputer that would allow the input of mailing list customer information that allowed the entry of 750 customers with 5 entries per customer. The program was instructed to perform the sort by fields. The first priority field was the Zip Code numerically (states were then automatically sorted). The second priority field was the town, alphabetically by Zip Code (since some Zip Codes have multiple towns). Then came the last name as the third priority field. Then the first name as the fourth priority and finally the state.

The sort was performed on a computer with 48K of RAM in 5 seconds. Sound incredible?

This sort was not done by normal BASIC programming methods. Instead, a machine language sub-routine was `POKEd` into the computer's memory using normal BASIC programming commands that for the most part exist in the ZX/TS computers. Machine language on that computer can operate as much as 400 times as fast as the BASIC language. The possibility exists for someone to write that type of routine for your computer.

I see the hand in the back of the room is waving wildly again and I think I anticipate his question. Go ahead, Sir.

He says that so far I have shown you how to sort one list of variables but what if there are multiple lists, such as in a name and address program such as the `FILE`

program on the October 1982 cassette? He wants to know how each item or field can be sorted.

MULTIPLE ARRAY SORT

OK, as an example, let's start simple. Let's write a routine that creates a second array of string variables that we can easily correlate to the first string array.

Let us work with the last `SHELL` program as an example. `SAVE` it on tape first (string version/not numeric version - all of the `{}` intact) using the name `SHELL` and then enter the following lines:

```
15 DIM C$(B,5)
95 LET C$(N) = B$(5) + B$(4) +
  B$(3) + B$(2) + B$(1)
```

And change the following lines to read:

```
120 PRINT N;" - ";A$(N),C$(N)
1210 PRINT N;" - ";A$(N),C$(N)
```

And delete lines #105 and #1199

Now `RUN` the program and `ENTER` "20" for the first prompt. You will notice that the second row of string variables is the reverse or mirror image of their counterparts in the first row. This should make it easy for us to identify the corresponding data to see if the counterparts were also sorted.

Press the `ENTER` key again and look at the data that is displayed on the screen now.

Restrain yourself in the back row. I know the second row isn't sorted. You will notice that the first row is. The reason the second row isn't is because we haven't put in the routine to accomplish this yet.

Enter the following lines:

```
1111 LET B$ = C$(1)
1112 LET C$(1) = C$(L)
1113 LET C$(L) = B$
```

CONT. ON PAGE 2



VIEW OF VU-CALC

One of the most powerful programs available to the computer user for finding data that requires many calculations is the program Vu-Calc from Timex (03-1000).

In many stores that are selling the TS/1000 computers, this is the only software package that is available.

Unfortunately, the documentation that accompanies it can cause much frustration. We hope this article will help make the understanding of this program easier for you.

Once the user becomes familiar with the command format, the program can be used for many applications.

First, let's review the actual commands and data formatting techniques.

LOAD the program in the normal fashion (LOADTM) and after the program has initialized, you will see appear on the screen:

V U - C A L C

ENTER E = TO ENTER VU-CALC
C = TO CONTINUE VU-CALC
S = TO SAVE WITH DATA
W = TO SAVE WITHOUT DATA

OPTION?
L

At this point it is a good idea to make a back-up copy of VU-CALC on a blank cassette by using option (W).

After you have (or have not) done this, go to option (E).

You will now see a grid of rectangles from 01 to 03 across and

from A to I down and a command-option table at the top of the screen with the commands, FORMULA, DATA and CALCULATE.

The letters and numbers represent the co-ordinates of the columns and rows. The cursor which is represented by a shaded graphic rectangle is presently residing in the rectangle or box with the co-ordinates of A01.

CURSOR MOVEMENT

This cursor can be moved to any other box ONLY when the program is in the FORMULA-DATA-CALCULATE or (FLC) mode. To move the cursor, you simply press one of the arrow keys (5, 6, 7 or 8 un-shifted). Press the right-arrow key briefly and you will see the cursor move from box A01 to box A02.

Press the down arrow key briefly and you will see the cursor move from box A02 to box B02.

The expected effect can be achieved by using the other arrow keys.

A TOUR OF THE SPREAD-SHEET

Hold the down arrow key continuously and watch the effect on the screen. You will notice that the entire grid scrolls upward as long as the down-arrow key is held depressed until the last row (Z) is displayed.

Now hold the right-arrow key depressed until the last column (36) is displayed. We have now reached the limits of the Vu-Calc spread-sheet. A simple calculation (or the accompanying documentation) tells us that the Vu-Calc spread-sheet has 936 boxes. These boxes can be used to enter data

and/or formulas.

To enter data or formulas we want to return the cursor to the beginning of the spread-sheet. We can do this by using the up and left arrows but there is an easier way. Simply press the (H) key and the cursor instantly returns to the HOME position or box A01.

ENTERING DATA

If we press the (L) key, we are now in the LOAD mode which allows us to enter data into the box that the cursor is in. The LOAD mode will accept inputted characters that are either letters or numbers of a maximum length of 8 total characters in the box.

A - Entering Titles

This means we can now either enter characters to form a title that would be suitable for defining the data that follows in a column (vertical) or row (horizontal) or we could enter the actual data. Lets start with a title.

With the cursor in box A01, press the (L) key and then type in the word DATA. If enter an incorrect character, delete it with the shift (B) key. After it is typed in, press the ENTER key. The program has now returned to the F.L.C. mode.

You probably noticed that the keyboard responds slowly to your inputs. Be careful not to miss a character as you are typing.

Now press the down arrow and the cursor should move to box B01. Press the (L) key and enter JUN82 and then press the ENTER key. Repeat this process with the first 3 characters of each month until you have entered JUN82 into box G01.

You may notice that it is easy to forget to press the (L) key before you try to load data. After doing it a few times, it should become second nature.

Now press the (H) key and then

with the proper arrow keys, position the cursor in box B02.

B - Entering Numbers

When the cursor is in box B02, enter the following numbers in the boxes starting with B02 and going to G02.

2365, 1977, 3599, 8729, 7752 and 5457.

After the last figure is entered, bring the cursor HOME and position it at box C03.

Let us suppose that these figures represented the monthly sales figures of a small business. Let us further suppose that we wanted to see how much the sales either increased or decreased for any one given month as compared to the prior month.

ENTERING FORMULAS

Here is where the documentation fails us. No examples are given that clearly show the arithmetic functions. With the cursor in box C03, press the (F) key.

We are now in the formula mode. Enter the following formula:

$100 * (C02/B02)$

- and then press ENTER.

You will notice that the formula that we entered exceeds the 8 character limit that is imposed on data entry in the (L) mode. This is alright - in the (F) Formula mode, you can enter formulas that are up to 32 total characters in length.

THE FORMULAS ARE NOT VISIBLE in the boxes themselves. When the cursor is in the box position, the formula will appear at the bottom of the screen. THE BOXES MAY CONTAIN BOTH DATA AND FORMULA.

CAUTION - do not put a formula in a box that contains data or vice-versa if you intend to change the data or formula in the future - the formula

will become lost if data is entered or the data will become changed if the formula is executed.

If you feel that you will change one or the other in the future, use different boxes.

You will also notice that nowhere in the documentation is there any representation of the logical operators (+ - / () * and others) which are essential if one is to make this program work.

The sample formulas on page #4 showing dashes (-) in between the box co-ordinates are not only incorrect but misleading. I was only able to know this myself because of previous experience with the Visi-Calc programs for other computers.

This is what makes it so hard for the users to get started with a program like this even though the program in itself is excellent. The user either figures these things out by him/herself, seeks the answers from an outside source or gives up.

Oh well, to continue:

What we are doing in the above formula is asking the computer to take the numeric contents of box C02 (the number (1977)) and divide it by the numeric contents of box B02 (the number (2365)) and multiply the result by 100.

This should give us a percentage relationship of the two figures that we interpret as an increase or decrease of sales.

After we have entered the formula, we notice however another prompt at the top of the screen that allows us the options of (R)ELATIVE or (A)BSOLUTE. The following describes the 2 options:

RELATIVE

- the same formula will be applied along the row or column but the BOX NUMBERS will be incremented by (1)

in the direction of the row or column. This means that each box that is below the preceding box, if we are concerned with the data in the columns, will automatically have a formula inserted into it that will reflect the same adjacent boxes to itself as the original formula reflected the boxes adjacent to it. This is called replication.

ABSOLUTE

- the same formula will be applied along the row or column but will not change. This means that the same data will be displayed in all the boxes. This is called duplication.

These 2 options are not represented in the documentation at the proper time they appear on the screen. The documentation makes reference to them on page #5.

For our example, let's take the Relative option by pressing the (R) key and we now find that the screen displays the following:

MOVE BY (R)OW (C)OLUMN OR (E)XIT

If we EXIT, the formula will apply ONLY TO THE CURRENT BOX and we will return to the main command (or FLC) table.

If we select ROW, the formula will be placed in all the boxes we will soon specify DOWN the screen from the first formula box to the last. This seems to me to be the exact opposite of what we should expect because the ROWs have been defined in the text as being horizontal or in other words, from left to right. This, I am sure, has confused almost everyone who has tried to use this program.

If we select COLUMN, the formula will be placed in all the boxes across that we specify, starting with the first formula box.

For our example, we will select ROW and press the (R) key.

We are now faced with the prompt:

TO ROW ?

Tricky! This is probably why the previous prompt required (R)OW to be inputted. If they had it the other way, there probably would have been just as much confusion.

But here is probably the area where most of us are going to make mistakes. If you put in the wrong information here, the program will bomb when you later try to execute the formula.

If you have selected the ROW option, you must put in the letter of a ROW. On the other hand, if you selected COLUMN, you must put in the 2 numbers that represent the specified column. Your entry at this point MUST BE A BOX THAT IS EITHER TO THE RIGHT OR UNDER THE LAST FORMULA BOX AND MUST BE EVEN WITH THE LAST BOX CONTAINING DATA.

You have no idea how many error messages I later got before I discovered this. To compound my frustration, I kept getting the error message, C/5110 at box B02 which means I supposedly had alphabetic characters in that box when actually the number <2365> resided there.

You can observe the error messages on pages 6 and 7. There are only 3 possible errors. If you get one of them, look up its definition and then enter GOTO 9000 and the box where the error occurred will be displayed.

I finally overcame the problem by re-entering the number <2365> into that box and when I tried the calculation from box C03, it worked.

The easiest mistake to make is to tell the formula that you want it to replicate to a row or column that has reference to a box that has no data in it.

If you have a formula that must make reference to a no-data box, simply put a <0> in that box first before you <C>ALCULATE.

Expect to get a lot of errors because of this. We will go over it again soon, but first let us continue with our example.

I am getting ahead of myself here, but for a purpose. Let us continue with our example:

Enter the letter <G> for the ROW option which means we want the incremented formulas to be replicated (many computer authors say replicated when they mean duplicated - not me, unless it is true replication and not duplication, the difference being that some item of the formula has changed in a steady pattern. To many authors say replication when they mean duplication) from the first row <C> all the way down to <G>.

Now use the down arrow to observe all the formulas to the box G03 one at a time.

Pretty neat, huh? As the man said, "you ain't seen nuttin' yet".

CALCULATIONS

Now press the <C> key.

There you are - all the calculations have been performed. The boxes in the <03> column now show figures that represent how any given months sales compared to the previous month as a percentage with <100> being equal to the previous month.

Let's now introduce another formula to produce a running total. Position the cursor into box A04 and press the <L> key.

Enter a <0> into this box. The reason we do this is because in the following formula, we are starting with the contents of this box and then the formula will be replicated. This box will only be used on the first cycle. If we left it blank and tried to calculate the formula, an error message would occur.

Drop the cursor down to the next box, B04 and enter the formula

{B02+A04} and press the ENTER key.

Use the same format for key entry responses to the up-coming prompts as you used for the first formula and then press the {C} key to calculate the results again.

Pretty nifty, huh?

We now have the formula replicated (not duplicated because it has changed by being incremented from box to box) and a running total for each month.

By the way, it makes no difference where the cursor is located when the {C}ALCULATE key is depressed. All formulas on the spread-sheet that are in boxes on the screen will total simultaneously. Other formulas that are not on the screen may not change the data that is in their boxes however. This is a weakness of Vu-Calc because the user has to scroll the screen to all the rows and columns with formulas and keep pressing the {C} key if data is ever changed. I can envision many complaints about this one and will give an example you can try yourself a little later on.

Let's try one more set of calculations. Move the cursor to box B05 and enter the following formula (you'll notice, I no longer give the step by step instructions because I'm sure by now you are close to being an expert at this), {100*(B02/G04)}.

This time however, when the prompt comes up for {R}ELATIVE or {A}BSOLUTE, enter {A} and on the next prompt, {E}XIT. Move the cursor down one box and enter the formula {100*(C02/G04)}.

Again use the {A}BSOLUTE and {E}XIT prompts and keep repeating this process with the 6th character of the formula representing the current row until the last formula entered is in row {G}.

Now execute the {C}ALCULATE prompt and observe the results.

We now have a representation of each month's sales figure as a percentage of the total.

CHANGING DATA

As a next to the last exercise, return the cursor to box B02 so that columns {02} to {04} are showing on the screen and change the data to {4211}. Now press the {C} key. If you observe the data in column 4, you will notice that it has changed accordingly.

If you scroll the cursor as to observe column {05} you will notice that the data in that column has not changed from when the box B02 had {2365} in it. If you press the {C} key, it changes accordingly.

Thinking that maybe the program could only calculate what was on the screen, I decided to try a test.

Trying this exercise again but with having the rows 01 to 03 observable on the screen, I got the identical results. Column {04} which was un-observable was in fact changed accordingly, but column {05} was not.

Apparently the program can change the data only up to a limit and it is up to us to check it to see if it is correct. This is probably the most glaring weakness of the program.

GET and SET

OK, now for the last exercise. Suppose we have a very involved and intricate formula that we have already entered into one of the boxes and we want to have that same formula in another box that we cannot duplicate it into with the commands we have covered so far. Here is how we do it.

Let us use the formula in box C03. Move the cursor to it and press the {G} key. The Message {M}AKE THE FORMULA CURRENT OR {C}HANGE appears. If you {C}HANGE, the mode will return to the main heading. I cannot see any useful purpose for

this prompt. The old formula is erased from the screen and you have no way to edit it. You can't even see it so that you could use it as a format for writing a new formula. To me the prompt (C)RANGE should allow the user to edit the formula.

If you decide to (M)AKE the formula current, the formula is now loaded into the cursor where the cursor is going to act as a vehicle to move the formula to another box.

Now move the cursor to the box you want the formula in and press the (S) Key to set the formula in that box.

The message (FORMULA LOADED) will briefly appear at the top of the screen and the formula is now SET in that box. Be sure to use a box to the right and low for this example or else strange formulas may enter your box.

The new formula does not have the same box co-ordinates as the old formula did. This is what the prompt (M)AKE THE FORMULA CURRENT means and if you try to execute the (C)ALCULATE prompt at this point, you will get an error message.

The reason for this is that there is no data in the boxes referred to by the new formula.

"What good is this?" you ask. Well, you may have a situation where you may need the same formula but you have different data that you want to enter into it - such as totaling certain statistics on a yearly basis. The figures change each year but the formulas stay the same.

What you have to do is to now insert the statistics or data item entries into boxes as outlined by the box co-ordinates of the new formula box.

DELETE

If you don't like the formula in any given box, just put the cursor into that box and press (D).

RETURN TO MAIN MENU

Press the (Q) Key when your ready to quit or if you want to save your data on a blank cassette. The prompts for saving from the main menu are self-explanatory.

If you wish to erase all the data and formulas, just enter (E) from the main menu and you can start fresh.

In review, I might suggest that you review the documentation, especially the error messages on pages 6 and 7. Experiment with your own formulas and applications using the logical operators to create your own formulas. The (**) operator unfortunately doesn't work. In the formula mode, test each key to see what entries can be made and make a list of what symbols can be used.

In the last issue, I said that if VU-CALC did one tenth of what its big brothers, the Visa-Calc programs did, it is certainly worth the price.

It does more and it is!



The bombs didn't bounce!

EDITOR RAMBLINGS



SINCLAIR'S PRINTER NOW AVAILABLE

Gladstone is now selling the Sinclair printer for \$99.95. They are offering a free 32 page catalog showing all of their products. Another interesting item is their professional keyboard & case that connects to the computer with no soldering required. The case allows the TS/ZX circuit board to be mounted inside with output jacks for cords and expansion devices (RAMpacks, etc.). Price for the keyboard is \$85.00 and the case is \$25.00.

Gladstone had 100 of these printers in stock and sold them the first day. We ordered one with a company check, but the credit card holders beat us to the original stock. We still hope to get ours soon.

For further info, contact Gladstone Electronics 1585 Kenmore Ave, Buffalo, NY, 14217 (1-800) 833-8400 or (716) 874-5510.

MEMOTECH OFFERS PROFESSIONAL PLAIN PAPER PRINTER

The GP-100 converts the Sinclair code into ASCII code and prints on a standard 9 1/2 x 11 fanfold computer

paper. The specifications are as follows:

- 5 x 7 dot matrix impact
- ASCII upper & lower case (graphic letters are lower case)
- 30 characters/sec.
- 80 character/line
- 8 bit ASCII code
- Original + 1 or 2 copies
- 10 characters/inch
- 6 or 9 lines/inch
- 5 or 7.5 lines/second
- Single color, special self-inking cassette type ribbon

The GP-100 is manufactured by Seikosha of the Siko group and includes the printer, Memopak Centronic Parallel interface and the Centronic parallel connecting cable. It sells for \$399.00 plus 9.95 for shipping & handling.

Memotech also sells the parallel interface board by itself for 104.95 or a serial interface board for 139.95. These devices would allow you to hook up other printers and/or computer typewriters.

For further informations contact Memotech Corp., 7550 W. Yale Ave., Denver CO, 80227 or call (303) 986-1516 or TWX 910-320-2917.

Our thanks to Bob & Gloria DeLisle of Hammond IN for forwarding this information to us.

NEW PRINTER FROM CAI

And if you haven't had your fill of printer news, CAI is now offering still another printer besides the two they already offer. What makes this one different?

It connects directly to the computer and doesn't need the CAI/O board like the others do. It prints in 40 character per line mode or 20 (double size) character per line mode.

The CAI/P40 sells for \$139.95 - add \$5.00 for shipping - MI res. add 4% tax.

CAI also has the best price I've seen on the Memopak 64K RAMpack for \$159.95.

For further info contact:

CAI Instruments
PO BOX 2032
Midland, MI, 48640
(517) 687-7343

TIMEX RAMPACK SHORTAGE

It is becoming more difficult to find stores that have the Timex 16K RAMpacks in stock as the demand becomes greater. It is not unusual to find many of the stores not even having the computers.

If you have trouble getting one, the best one I have used is being sold by Memotech for \$59.95 for the 16K version. Even though it is \$10 more than Timex's, it allows you to piggy-back another 16K or 32K module on the back. This is something to keep in mind if you need more memory.

TIMEX DEMO BOOTHS

We have received reports that K-MART is now selling the TS-1000s on the west coast, which means for those living out there, you should be able to get the available

software too.

If you have ever gone into some of the chain stores that have booths for demonstrating computers such as the VIC-20 and ATARI, Timex is now supplying these booths to some of the chains. I saw the first one in a K-Mart but it wasn't hooked up yet.

What this means to you is that you will be able to check out the software or RAMpacks you are interested in purchasing before you buy them.

WINKY BOARD INTERFACE

Have you ever wanted to duplicate tape programs that were non-savable? Consider first that copyright laws do not allow copyrighted programs to be copied and resold. Many times we want a duplicate tape for a backup just in case the original malfunctions, but strictly for our own use.

Or maybe you have written a bunch of programs that are all on one tape and you want to give a duplicate to a friend. You could LOAD & SAVE each program from original to duplicate tape. There is, however, a much simpler way.

The Winky Board can duplicate any ZX/TS tape (single or multiple programs) from one recorder to another. That's right, you don't need the computer for this process.

The Winky Board has 2 LED lights that let you immediately and precisely set the optimum tape volume adjustment for any tape you want to LOAD.

An earphone eavesdropping option allows you to listen to the pulses without manipulating jack plugs and/or cassette volume control.

It can be used with the computer to LOAD or SAVE programs and filters electrical noises and interference to eliminate a common cause of unsuccessful LOADs.

It can be used to aid in tape head realignment with its LED monitors.

The open board unit requires no power or modifications to the computer and sells complete, assembled and tested for \$18.00 PPD. The kit sells for \$12.00. Add 1.00 extra if you want the earphone. PA residents add 6% - overseas must add \$2.00 for shipping and must be paid by International MO or in US currency.

The unit is very well documented. It came too late for me to do an actual test but we hope to do one soon and print the results for you.

For further info contact:

G. Russell - Electronics
RD 1 BOX 539
Centre Hall, PA, 16828

MISTAKES IN THE SEP/82 MAGAZINE

We saved the worst till last. Hopefully, this will be the last month where listed programs will have mistakes. Because of lack of printers, we were transferring the listings by observing the TS/ZX CRT and re-typing the information into a word processor. It is amazing how we can sit with a typed-out listing and compare it with what is on the screen and still have mistakes go by us. Next month, if we have any of the three printers we have ordered from supporting companies, we will use the direct computer listings.

On page 10 of the SEP/82 issue, change the following lines on pages 9 & 10 to read:

250 FOR N = 11 TO 20
340 PRINT AT A,N; A\$(B)

If you don't know how to make an inverse asterisk as requested in line 10 on page 9, it is done as follows:

After you have the first quotation mark on the screen, hold down the SHIFT key and press the (9) key. This puts the computer into the GRAPHICS mode as evidenced by the (6) in the cursor. Now hold down the SHIFT key and press the (8) key. The

inverse (x) should appear after the ("). Now hold down the SHIFT key again and press the (9) key. The (L) should reappear in the cursor. Now type in the last quotation mark and ENTER the line.

RUN-IT SOFTWARE CLUB

You've heard of Book of the Month Clubs? How about a Software of the Month Club. A press release from Run-it reads as follows:

"Very soon, Timex/Sinclair users will find a unique solution to that never-ending thirst for quality program tapes.

The Run-it Software Club will initially be introduced to user groups around 11/01/82. 10 to 15 Run-it programs will be presented at that time, including games, educational and personal/business/finance programs. Each will offer quality duplication, ease of use and utility in the home computer situation.

Each Run-it program will come with a money-back guarantee. One or two programs will be featured each month, priced at 30% to 40% off retail. Other selections (which eventually will reach 30 or more each month) will be offered at 10% to 20% off retail or conventional mail order price. Further announcements will be released to user groups and Timex/Sinclair related publications.

For further information contact -
Run-it Software Club, 732 S.
Sherman, Chicago, IL, 60605, (312)
427-6526

(My understanding, after talking to a company representative, is that Run-it will not only sell to user groups but also to individuals - Ed.)

Letters To The Editor

Dear Ed,

Sometimes programs that I try to load from cassette won't load by name but will load with the default method of using two quotation marks. I still can load the program but I'm wondering why this happens?

John Bernacki - Amherst, NY

Dear John,

I'm writing this letter to tell you I have found another ... Oops, wrong person.

I don't know for sure, but I think it has something to do with the volume level or possibly with line interference. If anyone has done a study of this phenomenon, please let us know.

Dear Ed,

As a new subscriber to Synchro-Sette Magazine, I am lost with the first tape I received (AUG/82). I have tried for several hours to load the 16K side on my Timex but there is something I am doing wrong. I can load the "BULLETIN" with no trouble but as soon as it is loaded, it starts running and I can't get the "NAME/ADD" program to load at all. I also don't understand how to load the "LOADER-16K" program and the other programs at the same time. What do you need to get back to the menu from the programs?

I have been able to load everything except the "NAME/ADD" program but I can't get more than one at a time. I have the 16K RAMpack and I can load and save any other programs without any trouble. I need help.

Yours truly - J.R.H. - St. Charles, MO

Dear J.R.H.

First of all, I want to tell you I watch you on TV all the time and am one of your biggest fans. I try to incorporate policies you've used on the TV show into my business.

In answer to your questions, first of all, only one program can reside in the computer at a time. The LOADER programs can load any of the programs in the menu but once one of them is loaded, the LOADER program is lost.

A better way of getting to the programs is to get a recorder with a tape counter and list the number location where the beginning of each program is.

After the "BULLETIN" program has loaded, the diagonal lines have disappeared. At this point, STOP the recorder. The 16K RAM is now doing a checksum of the program and it will RUN in a few seconds. If you were allowing the recorder to continue to PLAY, it probably ran over the first part of the "NAME/ADD" program and if you shut it off to late, that program won't LOAD.

You can easily find out where programs end and begin by removing the EAR plug from the recorder while it is PLAYing and listening for the portions of the tape where the sound goes blank. This blank period of sound usually lasts for only 4 or 5 seconds before the next program begins so it is easy to see that the recorder could run over it if you don't shut it off.

This is a standard procedure for saving multiple programs on one tape, much like the songs on an LP

record album.

We realize that many of you have never touched a computer before owning one of the Sinclair machines. Many of the procedures that we take for granted, a newcomer sees as a completely foreign world.

Please, if you have any questions that can't be answered by the owner's manual, contact us or your local users' group, if you have one.

Dear Ed,

Just a brief note to thank you for your assistance with the accuracy problem on my ZX-81 and to let you know that less than one week after I was told by the Timex authorized repair service in San Diego that the TS-1000 would not be sold on the west coast until after the end of the year, the machines were sold at a local discount drug chain - so much for credibility.

I am interested in obtaining a copy of the TS-1000 manual and Demo tape.

Jim Phillips - Chula Vista, CA

Dear Jim,

The manual for the TS-1000 seems identical to the ZX-81 manual except for the reference to the 2K machine as opposed to the 1K ZX-81. The pages aren't numbered the same although the text is in the same order. The cover is red and that about tells you the differences.

Our manuals really get passed around here as does any of the single copy software but if you would like a copy with the demo tape by itself, you might try contacting Timex direct.

TIMEX COMPUTER CORP.
PO BOX 2126
WATERBURY, CONN., 06720

Dear Ed,

I had a little trouble with the "INFLATION" 1K program as printed in

the 9/82 issue of Synchro-Sette.

In order to get it to display as shown on page 7, I changed the program as follows:

```
170 PRINT, I$;" THAT COST ";C;  
TAB 31;" IN 1982, WILL COST "  
;F;TAB 31;" IN ";Y;"."
```

The program runs without any problems and the display models the sample in the magazine.

I am a new subscriber to Synchro-Sette and any info you have on the Mindware plain paper printer mentioned on page 85 would be appreciated.

J.F.P. - Brooklyn, NY

Dear J.F.,

The line you mentioned was wrong as put in the magazine. The proper format as originally written was pretty much as the one you offered.

As of this writing, Mindware's printer is still awaiting FCC approval. We did a review of it in an earlier issue but to cap some of its features, it is a ribbon dot matrix printer that prints on standard adding machine tape.

All other printers print at least 32 characters. This one only prints 16 characters. The computer can be made to print either the left side or the right side of the screen. The two pieces of paper tape are taped together to give the full 32 characters.

On data generating programs such as a name and address program to make mailing labels, 16 characters should be sufficient. All the user would have to do is cut out the labels with a pair of scissors and glue them onto the envelopes. There isn't a less expensive system of accomplishing this and our "FILE" program in this issue could easily be converted to do this.

Ed.

ORDER FORM

Check Items Wanted:

PACKAGE #1	3 Challenging Games	14.95 ()
PACKAGE #2	3 Old Friends	12.95 ()
PACKAGE #3	3 Short New Friends	10.95 ()
PACKAGE #4	2 Home Budget	14.95 ()
PACKAGE #5	Oracle/Intellect	14.95 ()
Back Issue Package 4-5/82 4/82 cass.		8.00 ()
Back Issue Package 6-7/82 6/82 cass.		8.00 ()
Back Issue Package 8-9/82 8/82 cass.		8.00 ()

IL residents add 5.25% tax

Outside U.S.A. add 1.00 shipping

Send check, money order or Visa/MC #

U.S. currency only

NAME

ADDRESS

CITY/TOWN

STATE

ZIP CODE

PHONE

CREDIT CARD #

EXP. DT.

TYPE OF COMPUTER & ADD. EQPT.

THE S & S COMPANY
388 W. LAKE STREET
ADDISON, IL, 60101
(312) 628-8955